Review to optimization

candidate list 1. endpoints

critical points 2. $f'=0$

3. f' undefined

absolute extrema: (there can only be one)

plug candidates into $f(x)$, choose most extreme value

relative extrema: (could be more than one)

1st der test +0−, −0+ sentence

2nd der test $f'=0$, $f''<0$ (− −) max; $f'=0$, $f''>0$ (+ +) min

⚠ "is" vs "at"

$y=$ — is max max at $x=$ —

Feb 28-12:40 PM

Ex 1. Storm washes sand away from a beach causing the water to get closer to a road. The storm lasts 5 hours. Water gets closer to the road at a rate of $f(t)=\sqrt{t}+\cos t-3$. When is distance from water to road dec. most rapidly.

$f'=\frac{1}{2\sqrt{t}}-\sin t=0$

candidates $t=0$ $f(0)=-2$

$t=5$ $f(5)=-0.4803$

when $t=2.8404$ $t=2.8404$ $f(2.8404)=-2.2697$

$t=0.6619$ $f(0.6619)=-1.3976$

Feb 28-12:57 PM

Review to optimization

candidate list 1. endpoints

2. $f'=0$

3. f' undefined

absolute extrema: plug candidates into $f(x)$

relative extrema:

1st der test +0− or −0+, sentence

2nd der test $f'=0$, $f''<0$ (− −) MAX; $f'=0$, $f''>0$ (+ +) min

⚠ "is" vs "at"

y x

Feb 28-1:10 PM

Ex 1. A storm washes sand away from a beach causing the water to get closer to a road at a rate of $f(t)=\sqrt{t}+\cos t-3$ $\frac{ft}{hr}$. The storm lasts 5 hours. When is the distance from the water to the road decreasing most rapidly?

$f'(t)=\frac{1}{2\sqrt{t}}-\sin t=0$

$t=0$ $f=-2$

$t=5$ $f=-.4803$

$t=0.6619$ $f=-1.3976$

when $t=2.8404$ hr $t=2.8404$ $f=-2.2697$ $\frac{ft}{hr}$

Feb 28-1:26 PM